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air-sac was inflated, the distension varying from one-third full size to nearly two-thirds its complete capacity, according to circumstances. The air-sac lies between the trachea and the esophagus and could be felt with the fingers as a soft compressible bladder-like body that slipped about easily under the loose skin of the neck. In making the original dissections no sphincter muscle controlling the outflow of air was found, but it was supposed that the muscle *sterno-trachealis*, which is expanded over the air-sac, with the anterior angle of the expansion attached to the esophagus, "may close the aperture of the air-sac by pressing the esophagus against it." Observation of these living birds showed that this was true, and the contraction of this muscle was so strong that considerable manipulation was required to deflate the sac. I had supposed that the air-sac would always be deflated in diving, but this was not true in submersion to moderate depths at least. When birds were held under water it was possible at first to force out a small amount of air by compressing the air-sac between the fingers. This escaped by bubbles through the nostrils. Immediately, however, the muscle controlling the neck of the vesicle was contracted firmly, and a steady pressure of fifteen pounds or more on the sides of the air-sac failed to expel more of the air contained. It was possible however to deflate the sac completely by gentle manipulation with the fingers while the bird was not submerged. The process of re-inflation was slow, and was accomplished in three or four stages during an interval varying from one to three or four minutes in duration. There was no visible effort made by the bird during this process.

Examination of these living ducks substantiated the statement made that the tracheal air-sac was a secondary sexual character present in males but absent in females. Though the skin of the neck was full and loose in females there was no trace of a distended air-sac under it. Careful examination was made of several individuals in order to substantiate this point.

That male birds habitually keep this air-sac partly inflated even while diving is a strange fact as it might be supposed that the increased buoyancy would render it more difficult for them to stay submerged especially as the air reservoir is near the anterior end of the body. The only apparent use that it might have under these conditions is the questionable one of furnishing a reserve supply of air that might enable the bird to stay beneath the water for a longer period than normal. Need to utilize this, however, would not arise save under unusual circumstances.

*Washington, D. C., October 21, 1917.*

## NOTES ON SOME BIRDS FROM CENTRAL ARIZONA

By H. S. SWARTH

(Contribution from the Museum of Vertebrate Zoology of the University of California)

DURING the summer of 1917 the writer spent several weeks in that portion of central Arizona traversed by the scenic highway known as "the Apache Trail", extending between Phoenix and Globe. The trip was undertaken at the instance of Mr. E. O. McCormick, vice-president of the Southern Pacific railroad, with the purpose of obtaining data for a popular account of the birds of the region. Specimens collected were, by agreement, placed in the collection

of the Museum of Vertebrate Zoology, and of certain of these specimens, as well as of some of the data gathered, it seems desirable that more formal record be made than can be done in the proposed general account. Collecting was carried on at Tempe (May 29-June 5), Roosevelt Lake (June 5-11, July 2-5), Sierra Ancha (June 11-July 2), and Globe (July 5-7).

Features of interest regarding the bird life of this part of Arizona were found in the presence in the mountains of certain Mexican species, here apparently at nearly their northern limit, these occurring together with species from the Rocky Mountain region to the northward, in the local distribution of some of the birds, and in the absence of several species which might be expected to occur here.

It is for the most part of species from the Sierra Ancha that comments are called for. This range is a southern offshoot of the Mogollon Mountains, lying a few miles north of Roosevelt Lake. My headquarters here was at Carr's Ranch, altitude 5400 feet, and collecting was carried on to points within a radius of twelve or fifteen miles.

The southern slope of the Sierra Ancha is steep, hot and arid, and though the higher portion of this slope is in the Upper Sonoran Zone, the nature of the country is not such as to support a large or varied bird or mammal population, and consequently the presence of Upper Sonoran species is not conspicuously apparent. The northern exposures of the mountains, however, from about 5000 feet upward, are thickly covered with vegetation, mostly of typical Transition Zone plants, while there are running streams in every canyon; birds in consequence are exceedingly abundant.

The highest peaks reach an elevation of about 7500 feet. Although even at these points the mountains do not extend above the Transition Zone, there is, nevertheless, some difference between the animal life of the higher altitudes and that of the region lying from 5000 to 6000 feet. On the upper slopes of Aztec Peak, above 7000 feet, I saw a very few individuals of the following species: Red-backed Junco (*Junco phaeonotus dorsalis*), Western Tanager (*Piranga ludoviciana*), Pigmy Nuthatch (*Sitta pygmaea pygmaea*), and Mountain Chickadee (*Penthestes gambeli gambeli*). At the 6000 foot level there were no juncos, while the other three species mentioned were replaced by their near relatives, the Hepatic Tanager (*Piranga hepatica*), the Rocky Mountain Nuthatch (*Sitta carolinensis nelsoni*) and the Bridled Titmouse (*Baeolophus wollweberi*).

Of Mexican species, the presence of which so strongly characterizes the avifauna of the mountains of southern Arizona, several were found to extend this far north, though only a few of these forms were really common. The Painted Redstart (*Setophaga picta*) was abundant. The Red-faced Warbler, of closely similar habits, was not seen by me, though it has been reported from points farther north. The Arizona Jay (*Aphelocoma sieberi arizonae*) was exceedingly numerous at from 5000 to 6500 feet, though these mountains must be close to the northern limit of the species. Coues Flycatcher (*Myiochanes pertinax pallidiventris*) was present in small numbers; the Olive-sided Flycatcher, which replaces the former species but a short distance to the northward, was not seen. Apparently none of the more southern species of hummingbirds reaches this far north, the Broad-tailed Hummingbird (*Selasphorus platycercus*) being the only species seen in the Transition Zone of the Sierra Ancha, and the Costa (*Calypte costae*) and Black-chinned (*Archilochus alexandri*) at lower levels.

In the Sierra Ancha there was a notable absence of several species of birds

that might confidently be expected to occur there. No nighthawks of the *Chordeiles virginianus* group were observed, though *C. v. henryi* is known to breed at the same altitude in other parts of the state. The absentee whose defection was most unexpected, though, was the Audubon Warbler (*Dendroica auduboni*). Not one was seen, in mountains affording many miles of apparently ideal surroundings for the species. This section is debatable territory between the ranges of *D. a. nigrifrons* to the southward and *D. a. auduboni* to the northward, and birds occurring in the region might be expected to illustrate intergradation between the two. It would be a most unexpected development should further exploration in central Arizona fully demonstrate what seems to be indicated here—a hiatus where neither form of the species occurs. My visit to the Sierra Ancha was too brief to warrant any sweeping statements of this nature, but the fact remains that in a sojourn of nearly three weeks amid favorable surroundings not one Audubon Warbler was seen, and it is a species with notes and actions sufficiently conspicuous to advertise its presence.

Additional species presenting points of special interest are listed below.

**Dryobates pubescens homorus.** Batchelder Woodpecker. Four or five seen in the Sierra Ancha, all in walnuts or maples along the streams. This can hardly be regarded as a new locality record, for Mearns (*Auk*, vii, 1890, p. 252) found the species breeding in the Mogollons, of which the Sierra Ancha are a southern off-shoot, but it has been seen at so few points in Arizona as to make any occurrence worth reporting.

**Antrostomus vociferus macromystax.** Stephens Whip-poor-will. At Carr's Ranch on the evening of July 1, a whip-poor-will was heard calling repeatedly. The species has not been reported heretofore from north of the Graham Mountains.

**Myiarchus magister magister.** Arizona Crested Flycatcher. Seen in small numbers about Tempe, at Roosevelt Lake, and north to the base of the Sierra Ancha. It has not been previously noted this far north in this section of the state. All the birds seen were in the neighborhood of giant cactus, and the range of the species in Arizona is probably co-extensive with that of this plant.

**Icterus parisorum.** Scott Oriole. An adult male was seen from the stage a few miles east of Fish Creek station, between Tempe and Roosevelt. At this point the hills were well covered with agaves, an association frequently favored by this oriole. One or two others were seen or heard about Roosevelt Lake. The Scott Oriole has not before been noted this far north in central Arizona.

**Loxia curvirostra bendirei.** Bendire Crossbill. Two specimens, adult females, taken at Carr's Ranch, Sierra Ancha, June 16. Crossbills reported from Arizona heretofore have all been of the Mexican subspecies, *L. c. stricklandi*, but these two individuals are unmistakably the smaller-billed Rocky Mountain form. They were evidently not breeding.

**Spizella atrogularis.** Black-chinned Sparrow. Found in the Sierra Ancha, breeding in small numbers at from 5000 to 6000 feet altitude. As elsewhere, the birds were here frequenting hot, brushy hillsides, where the loud, characteristic song of the males gave unfailing evidence of their presence. There are but two previously reported summer stations for this species in Arizona, Fort Whipple, and the Hualpai Mountains.

**Junco phaeonotus dorsalis.** Red-backed Junco. A very few juncos, not more than three or four in all, were seen about the summit of Aztec Peak, Sierra Ancha, where one specimen, an adult female, was taken June 26. This bird, in

its dimensions, is referable to *Junco p. dorsalis*, but in the extension of the reddish dorsal coloration upon some of the greater wing coverts and tertials it approaches *J. p. palliatus*. In fact there are examples of the latter race at hand, from the Huachuca Mountains, Arizona, in which the dorsal markings are practically the same. The bird in question, however, had the unmistakable brown iris of *dorsalis*, as I hastened to ascertain as soon as I had the specimen in hand, instead of the white iris so conspicuous in *palliatus*.

The color of the eyes in these closely related forms of *Junco* provides subject matter for speculation as regards the nature of specific and subspecific differences between animal forms. As a rule we regard as subspecies those races which are distinguished by the varying development of some common character or characters, as of shades of color, extent of markings, greater or lesser size, etc.; whereas the presence or absence of some one definite feature is supposed to indicate a much wider degree of difference between the forms thus characterized.

In the case of the two Juncos, *dorsalis* and *palliatus*, the eyes are conspicuously different, being dark brown in one, pale yellow, almost white, in the other, and there is apparently no intergradation between the two in this respect. At any rate, in a large series of *palliatus* from the Huachuca Mountains, Arizona (about sixty specimens), there is none that showed any approach toward *dorsalis* in color of eye. In other characters the series shows considerable variation, there being many specimens which in dorsal coloration closely approach typical *dorsalis*.

Despite the absolute difference in color of iris between the two forms, they are generally regarded as being but subspecifically distinct. Ridgway (Birds N. and Mid. Am., 1, 1901, pp. 297, 299) considers them as two species, but whether this treatment is mainly based upon the color of the eyes is not apparent. In the juvenal plumage of *palliatus* the iris is dark brown and the bill is dark colored. When the first winter plumage is acquired the iris becomes yellow, the upper mandible black and the lower yellow.

In eastern North America there is a similar case in the two towhees, *Pipilo erythrophthalmus erythrophthalmus* and *P. e. alleni*. Judging from these two instances alone, of the towhees and the juncos, it would seem that according to our usually accepted standards the forms in question should be regarded as specifically distinct; but there are other cases among birds which seem to indicate that the coloration of the eye can not, perhaps, be judged by the same standards we apply to other characters. Among the bush-tits (*Psaltriparus*), for instance, at least in the species *Psaltriparus minimus* and *P. plumbeus*, white eyes and brown eyes occur indiscriminately, regardless of sex or locality.

***Amphispiza bilineata deserticola*.** Desert Sparrow. There are certain peculiarities in the local distribution of this species that seem worthy of comment. No Desert Sparrows were seen about Phoenix or Tempe, though the character of the country was apparently as well suited to the bird as were the sections about Roosevelt Lake and Globe, where it was present in numbers.

***Passerina cyanea*.** Indigo Bunting. On June 30 there was brought to me, for identification, a bird killed by a boy working in the garden. It proved to be an adult male Indigo Bunting, somewhat mutilated through being shot with a .22 caliber rifle, though not so much so but that it made a fairly neat specimen. The point where this bird was taken (Carr's Ranch, Sierra Ancha) is at about 5400 feet altitude, in the Transition Zone; and at the same place several pairs of Lazuli Buntings (*Passerina amoena*) frequented shrubbery bordering one of the

alfalfa fields of the ranch. No other Indigo Buntings were seen, but the specimen collected was to all appearances a breeding bird (testes 10 mm. long), and the duller colored female, if present, might easily have been overlooked through its similarity to the female Lazuli Bunting.

In the present paper two species are added to the list of Arizona birds, the Bendire Crossbill (*Loria curvirostra bendirei*) and the Indigo Bunting (*Passerina cyanea*). In this connection it may be of interest to review the present standing of the Arizona bird list. In my "Distributional List of the Birds of Arizona" (May 25, 1914), 362 species are included. Two additional species had been recorded in publications issued so shortly before my own paper that they were unavoidably omitted. Ridgway (Birds of North and Middle America, 6, April 8, 1914, p. 57) added the Red-bellied Woodpecker (*Centurus carolinus*). In the same volume (p. 695) the Aiken Screech Owl (*Otus asio aikenii*) is tentatively given as from an Arizona locality, but the true status of the specimen cited seems open to doubt. Oberholser, in his "Monograph of the Genus *Chordeiles*" (U. S. Nat. Mus., Bull. 86, April 6, 1914, p. 50) records the Pacific Nighthawk (*Chordeiles virginianus hesperis*).

Shortly after the appearance of my list, Cooke (Auk, 31, July, 1914, p. 403) added seven species: Pacific Loon (*Gavia pacifica*), Ross Snow Goose (*Chen rossii*), Black Vulture (*Catharista urubu*), Harris Sparrow (*Zonotrichia querula*), Sprague Pipit (*Anthus spraguei*), Western Golden-crowned Kinglet (*Regulus satrapa olivaceus*), and Sierra Hermit Thrush (*Hylocichla guttata sequoensis*). Then Gilman, in THE CONDOR (vol. 16, Nov., 1914, p. 260) added the Ring-necked Duck (*Marila collaris*) and Sierra Sapsucker (*Sphyrapicus varius daggetti*).

To summarize, we find species added to the Arizona list as follows: Ridgway 1, Oberholser 1, Cooke 7, Gilman 2, Swarth 2, in all, 13 additions. These added to the former list of 362 give a total of 375 birds for Arizona.

Berkeley, California, December 12, 1917.

## A RETURN TO THE DAKOTA LAKE REGION

By FLORENCE MERRIAM BAILEY

### I. BACK TO THE SWEETWATERS

THE LURE of the water fowl! How can one who has caught only tantalizing glimpses of the beautiful birds on their northern breeding grounds escape from it, "when the Red Gods make their medicine again"? To me the call of North Dakota was so strong that after four years, the last of which gave a field season in the mountains of Oregon, I answered the call by returning to the lake region of the prairies, prepared to devote the summer to the study of water birds. Realizing full well the limitations of a woman bent on the study of water birds, I went intending to be satisfied with what came my way, hoping that such casual experiences might in some part supplement the more thorough work of less handicapped field students.

On the way out, after leaving behind the beautiful spruce and tamarack swamps of northern Minnesota, the sign *Manitoba Junction* stirred my blood. How good it would have been to follow the straight northward pointing rails